REMARKS/ARGUMENTS

The Office Action mailed April 24, 2002 has been carefully reviewed. Reconsideration of this application, as amended and in view of the following remarks, is respectfully requested.

The paragraph on page 5, lines 12-19 has been amended to correct the number of U. S. Patent No. 3,779,939.

THE EXAMINER'S COMMENTS RELATING TO THE DRAWINGS

The drawings were objected to under 37 CFR 1.83(a) because they allegedly fail to show windows, a channel, gain blocks and cells, as described in the specification on page 9 last paragraph. A proposed drawing correction or corrected drawings was required in reply to the Office action.

APPLICANTS RESPONSE TO THE EXAMINER'S COMMENTS RELATING TO THE DRAWINGS

Applicants have revised the drawings and the specification to show windows, a channel, gain blocks and cells. A corrected drawing sheet one is enclosed with reference numerals added showing the windows, a channel, gain blocks and cells. The specification has been amended to utilize the reference numerals in describing the windows, a channel, gain blocks and cells. No new matter is being added by the amendment because only reference numerals are being added and the structure in the drawings is not being changed.

THE CLAIM REJECTIONS UNDER 35 USC § 112

Claims 4-8 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation "the thermally induced optical phase errors" in line 2. The Examiner alleges there is insufficient antecedent basis for this limitation in the claim.

The Examiner made the following statements: Regarding Claims 5 and 8, how is the liquid host divided into two equal lengths? How is the liquid host that circulates throughout the system placed in series? Furthermore, the drawings do not show that the fluid flows are arranged in opposite directions. Regarding Claim 6, the phrase "powerful laser beam" is vague. How is it powerful? What is the power output or the wavelength?

APPLICANTS RESPONSE TO THE CLAIM REJECTIONS UNDER 35 USC § 112

Applicants have amended claims 4, 5, and 7 to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4 and 7 have been amended to add the phrase, "wherein thermally induced optical phase errors are produced" thereby providing sufficient antecedent basis for this limitation.

Claim 5 has been amended to add the phrases, "a first flow channel and a second flow channel in said closed loop, said first flow channel and said second flow channel being of substantially equal length" and "circulating said liquid host through said first flow channel and said second flow channel in said closed loop so that said liquid host is divided into two equal lengths."

The Examiner inquired how is the liquid host divided into two equal lengths? As described by the drawings and specification and amended claim 5, the liquid host divided into

two equal lengths by "a first flow channel and a second flow channel in said closed loop, said first flow channel and said second flow channel being of substantially equal length."

The Examiner inquired how is the liquid host that circulates throughout the system placed in series? As described by the drawings and specification the liquid host that circulates throughout the system placed in series by "arranging the two cells 30 and 30' in series."

The Examiner stated, "Furthermore, the drawings do not show that the fluid flows are arranged in opposite directions." The Examiner is requested to look again at FIG. 1, particularly in view of the reference numerals that have been added. In cell 30 the fluid flow at the end of the channel 28 is upward; whereas, in cell 30' the fluid flow at the end of the channel 28' is downward.

The Examiner stated, "Regarding Claim 6, the phrase "powerful laser beam" is vague. How is it powerful? What is the power output or the wavelength? The laser is described by the drawings, specification, and claims as being powerful. This is a sufficiently clear description of the laser beam.

THE CLAIM REJECTIONS UNDER 35 USC § 103

Claims 1-9 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Kocher et al. (U.S. Patent No. 5,307,358) in view of Scheps (U.S. Patent No. 5,307,358). The Examiner made the following statements:

Regarding Claim 1, Kocher et al. teach in Figure 1 a cell for use in a circulating liquid laser comprising a laser chamber/cell (12), a pumping device (22) and a liquid active material. Other types of optical pumping sources, such as laser diodes and semiconductors lasers are standard in the art. Kocher et al. do not teach trivalent titanium ions dissolved in a liquid host. Scheps teaches in Figure 2 a laser system comprising a gain medium (11) doped with trivalent

titanium ions and further teaches in column 12 lines 2-5 that said gain medium may be a liquid. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the trivalent titanium ions dissolved in a liquid host in Kocher et al., as taught by Scheps, to produce a laser output with a specific wavelength. It is known in the art that the wavelength range over which the laser system operates is determined by the dopant/dopants used in the laser gain medium. (See Scheps column 5 line 66-68).

Regarding Claim 2, Kocher et al. teach a circulation system.

Regarding Claim 3, Kocher et al. teach a closed loop circulation system comprising a pump (24) and a heat exchanger (26).

Regarding Claims 4 and 5, Kocher et al. teach in columns 1-3 that said circulation system prevents the optical distortion from thermal effects. Furthermore the Applicant states in the specification on page 16 lines 1-7 that these features for reducing the thermal effect are known in the art.

Regarding Claim 6-8, the method of a device is not germane to the issue of patentability of the device itself, since the device itself obviously uses the method. Therefore the rejection used on the device in Claims 1, 4 and 5, respectively, applies also to the method of the device.

Regarding Claim 9, Kocher et al. teach in Figure 1 a liquid laser device comprising an optical cavity (10), a pumping device (22), a lasing liquid, and a circulation system with a circulation pump (24) and a heat exchanger (26). Other types of optical pumping sources, such as laser diodes and semiconductors lasers are standard in the art and may be inside the optical cavity. Kocher et al. do not teach trivalent titanium ions dissolved in a liquid host. Scheps teaches in Figure 2 a laser system comprising a gain medium (11) doped with trivalent titanium

ions and further teaches in column 12 lines 2-5 that said gain medium may be a liquid. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the trivalent titanium ions dissolved in a liquid host in Kocher et al., as taught by Scheps, to produce a laser output with a specific wavelength. It is known in the art that the wavelength range over which the laser system operates is determined by the dopant/dopants used in the laser gain medium. (See Scheps column 5 line 66-68).

APPLICANTS RESPONSE TO THE CLAIM REJECTIONS UNDER 35 USC § 103

Applicants claimed invention utilizes "trivalent titanium ions dissolved in a liquid host." The Merriam-Webster dictionary defines ions as "an atom or group of atoms that carries a positive or negative electric charge as a result of having lost or gained one or more electrons."

(1) The Scheps reference does not show "ions dissolved in a liquid." Since Scheps does not show "ions dissolved in a liquid," the attempt to combine the Kocher system and the Scheps system does not establish a prima facie case of obviousness. Applicants claimed invention provides a "circulation system for circulating said trivalent titanium ions dissolved in a liquid host into and out of said lasing chamber." Since Scheps does not show "ions dissolved in a liquid," the cited references do not show or suggest "circulating said trivalent titanium ions dissolved in a liquid host into and out of said lasing chamber."

Under MPEP §2142, there are three requirements for the Examiner to establish a prima facie case of obviousness.

> (1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings.
> (2) There must be a reasonable expectation of success.

> (3) The prior art reference (or references when combined) must teach or suggest all the claim limitations. It should be noted that the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner's rejection of claims 1-9 under 35 U.S.C. §103 fails under the MPEP §2142 tests in that the references do not teach or suggest the combination, the references do not show a reasonable expectation of success of any such combination, and there is no teaching or suggestion of the claim limitations in the prior art.

Under MPEP §2143.01, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art." In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Since Scheps does not show "ions dissolved in a liquid," there is no teaching, suggestion, or motivation to combine the Kocher system and the Scheps system.

Any combination of the Kocher liquid system and the Scheps solid system would not have a reasonable expectation of success.

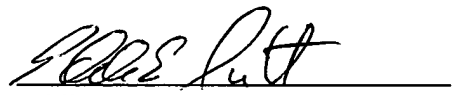
There is no teaching, suggestion, or motivation within the references to combine the Kocher system and the Scheps system. The combination is provided by Applicants disclosure. MPEP §2142 states "the tendency to resort to 'hindsight' based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art." Also, under MPEP §2143.01, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious

unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)

SUMMARY

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made." The undersigned respectfully submits that, in view of the foregoing amendments and remarks, the rejections of the claims raised in the Office Action dated April 24, 2002 have been fully addressed and overcome, and the present application is believed to be in condition for allowance. It is respectfully requested that this application be reconsidered, that the claims be allowed, and that this case be passed to issue. If it is believed that a telephone conversation would expedite the prosecution of the present application, or clarify matters with regard to its allowance, the Examiner is invited to call the undersigned attorney at (925) 424-6897.

Respectfully submitted,



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Dated: July 11, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 5, lines 12-19, please substitute the following new paragraph.

Liquid hosts containing rare earth have been considered. However, such devices were flash lamp driven leading to unacceptably large temperature gradients in the fluid and their poor beam quality. U. S. Patent No. [3,931,594] 3,779,939 to Erhard J. Schmitschek et al., assigned The United States of America as represented by the Secretary of the Navy, patented December 18, 1973, shows a liquid lasing composition consisting essentially of neodymium (III) phosphorus dichloridate, retained in solution with phosphorus oxychloride by the addition of a Lewis acid.

Page 9, lines 17 – 22, please substitute the following new paragraph for the original paragraph that appeared on page 9, lines 17-22:

Windows 27 and 27' at each end of the channel, channels 28 and 28', define [an] excitation [volume] volumes. The excitation volumes and semiconductor pumping devices 23 and 23' provide two gain blocks 29 and 29'. The two [Two] gain blocks 29 and 29' with opposite flow directions are used to compensate for the static optical wedge induced by fluid heating. The linear component, or optical wedge, that builds up in the liquid as it flows past the pump windows is predictable and steady. The lasing chambers 22 and 22' and gain blocks 29

and 29' provide two cells 30 and 30'. By arranging the two cells 30 and 30' in series in the laser cavity having opposite flow directions allows the wedge to be canceled.

IN THE CLAIMS:

4. (Amended) The laser of claim 2, wherein thermally induced optical phase errors are produced and including a system for correcting [the] said thermally induced optical phase errors.

5. (Amended) The laser system of claim 4, including a first flow channel and a second flow channel in said closed loop, said first flow channel and said second flow channel being of substantially equal length, wherein said system for correcting [the] said thermally induced optical phase errors includes a system for circulating said liquid host through [a] said first flow channel and said second flow channel in said closed loop so that [the] said liquid host is divided into two equal lengths along the laser propagation direction and placed in series in the lasing chamber with the fluid flows arranged in opposite directions.

7. (Amended) The laser method of claim 6 wherein thermally induced optical phase errors are produced and including the step of correcting said thermally induced optical phase errors.